

The claims in the application are claims 1 to 14, no other claims having been presented.

Applicants are submitting herewith an Abstract of the Disclosure on a separate sheet of paper.

All of the claims were rejected under 35 USC 112, second paragraph, as being indefinite. The Examiner objected to the "preferable" clause and to the term "suitable".

Applicants respectfully traverse these grounds of rejection since the amended claims are believed to properly define the invention. The preferred clauses have been removed from claims 4 and 7 and they have presented as new claims 13 and 14. The claims have been amended to conform to the American practice and therefore, are believed to comply with 35 USC 112. Therefore, withdrawal of this ground of rejection is requested.

Claims 1 to 9, 11 and 12 were rejected as being obvious over the Jaeger patent taken in view of the Sarnecki patent. All of the claims were rejected as being obvious over the Jaeger patent taken in view of the Sarnecki patent and further, in view of the Rose et al and Bohinski patents. The Examiner states that Jaeger discloses obtaining β -carotené from a biomass which is treated with a solvent and extracted with a water immiscible solvent and the β -carotene is then crystallized from an organic solvent. Sarnecki is cited to

show solvent extracted β -carotene being readily crystallized in water in a highly pure form. The tertiary references are cited to show the use of a vegetable oil at various times of the extraction process. The Examiner deems that the claimed process would be obvious therefrom.

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Applicants respectfully traverse these grounds of rejection since the amended claims are clearly distinct and not anticipated by the prior art cited by the Examiner. The main feature of Applicants' invention is the direct isolation of β -carotene type material from a microbial mass which direct isolation is effected by obtaining β -carotene crystals from a fermentation process without any solvent extraction. Applicants' process uses a washing step to remove lipids from the biomass and then an aqueous floatation step to separate the crystals from the biomass debris. There is no dissolution of the β -carotene crystals as is necessary in a solvent extraction process.

In contrast thereto, Jaeger describes a process wherein the β -carotene producing cells are extracted with a solvent followed by crystallization of β -carotene. The Rose et al reference shows a solvent extraction process in which the organic solvent is a vegetable oil followed by membrane separation of the organic and aqueous phases. The Bohinski patent describes a fermentation process and advocates the use of vegetable oils during the fermentation to enhance the yield of the fermentation process. The

Bohinski patent makes no mention of any procedure for recovering the β -carotene obtained during fermentation.

The Sarnecki patent describes a process for purifying β -carotene by treating crude β -carotene crystals with a surfactant followed by washing with water and not water alone. There is no mention made of a fermentation broth as a starting material for the purification process. The prior art cited by the Examiner relates to a solvent extraction process which the present process is intended to avoid. Therefore, withdrawal of this ground of rejection is requested.

All of the claims were rejected under obviousness type double patenting with respect to the claims of copending application Serial No. 09/214,375 because allegedly, both processes have the same basic process steps, namely, disruption of cells containing β -carotene, solvent extraction with an organic solvent and crystallization in water.

Applicants respectfully traverse this ground of rejection since the copending application is in no way directed to the present process. For the Examiner's convenience, Applicants are submitting herewith a copy of claims 18 to 28 as they appear in the copending application. The said copending application is directed to a means of obtaining highly purified β -carotene crystals from a natural source using a solvent extraction procedure for the

isolation of β -carotene. As noted above, Applicants' process is intended to avoid solvent extraction and uses a washing step to remove lipids and then an aqueous floatation step to obtain the β -carotene. The two processes are entirely different and the double patenting rejection is improper.

In view of the amendments to the specification and claims and the above remarks, it is believed that the claims clearly point out Applicants' patentable contribution and favorable reconsideration of the application is requested.

Respectfully submitted,
Bierman, Muserlian and Lucas

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CAM:ds
Enclosures

MARKED UP VERSION OF CLAIM

253.182

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: : E. Prats
M. SIEIJN et al :
Serial No.: 402,604 : Group: 1651
Filed: October 22, 1999 :
For: ISOLATION...BIOMASS :

600 Third Avenue
New York N.Y. 10016
April 24, 2001

AMENDMENT

Asst. Commissioner for Patents
Washington, D.C. 20231

Sir:

Responsive to the office action of February 2, 2001, please
amend this application as follows:

IN THE SPECIFICATION:

Please add as the last page of the application the Abstract of
the Disclosure submitted herewith on a separate sheet of paper.

IN THE CLAIMS:

Claim 1 (amended) A process for the isolation of crystalline
carotenoid compound from microbial biomass comprising disrupting
the microbial cell walls, separating cellular debris from the
carotenoid-containing residue, washing one member of the group
consisting of the microbial biomass, the disrupted cell mass and
the carotenoid-containing ^{residue} with a solvent to remove lipid,
suspending the obtained carotenoid crystals in water to float the
crystals, ^{and remove biomass debris} recovering the crystals and, optionally, further
purifying the crystals.